

Pedestrian Signal Control Treatments



**Two-Stage
Directional
Crossing**

DESCRIPTION

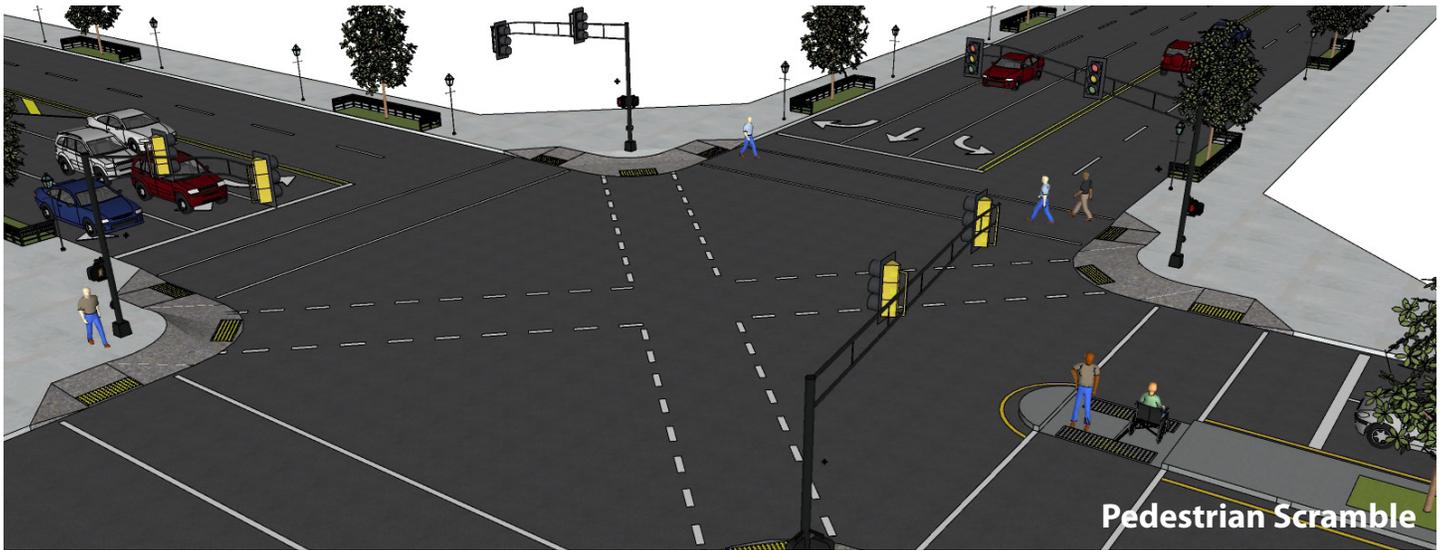
- A protected pedestrian signal phase is when all conflicting turning vehicular movements are protected-only and do not occur during the pedestrian signal phase. Parallel vehicular movements may occur concurrently with the pedestrian crossing.
- A two-stage signal-controlled directional crossing is designed to force pedestrians to cross the roadway in two separate movements. The z-configuration orients the pedestrian to bring their attention to the two separate crossings and to view oncoming vehicles while in the median refuge area walking from one crossing to the next.
- A pedestrian scramble is an exclusive pedestrian phase that stops all traffic at an intersection and allows pedestrians to cross in any direction (including diagonal).
- An LPI gives pedestrians three to seven seconds to begin entering the crosswalk before conflicting vehicles are given the green light. Turning vehicles must yield to the pedestrians in the crosswalk and may proceed once the crosswalk is clear.

CONTEXT

- A protected pedestrian signal phase allows pedestrians to cross while conflicting vehicles are stopped. Pedestrians can look to the pedestrian signal heads for indication of when it is safe to cross.
- A two-stage signal-controlled directional crossing is best implemented in mid-block areas with multiple lanes of oncoming traffic, but may be used at signal-controlled intersections or across a multilane roundabout leg.
- A pedestrian scramble is most commonly used in areas with extremely high surges of pedestrian traffic such as downtowns, university campuses, and sports arenas.
- LPIs are typically installed in areas with numerous pedestrian crashes, high pedestrian volumes, high volumes of children or older adults, or where turning vehicles make it difficult for pedestrians to begin a crossing.

BENEFITS

- ✓ **Improved safety**
- ✓ **Improved comfort**



POLICY AND DESIGN GUIDANCE

- Pedestrian refuge islands should meet the application guidelines provided in the VDOT Traffic Engineering Division Memorandum IIM-TE-384 Attachment A, "Unsignalized Marked Crosswalk Standards."
- The pedestrian walkway through a refuge island shall be at least 5-feet wide and at least 6-feet long.
- Two-stage directional crossings can be installed at any signal-controlled intersection approach. Additionally, they might be installed on unsignalized approaches or in midblock locations on roadway cross-sections with four or more lanes, a speed limit of at least 35 miles per hour (mph), or an annual average daily traffic (AADT) over 9,000.
- An LPI should last at least three seconds to ensure that pedestrians are able to cross at least one travel lane.
- LPIs should be accompanied by Accessible Pedestrian Signals (APS), which help visually impaired pedestrians navigate intersections using audible tones, speech messages, and vibrotactile feedback.
- The two-stage directional crossing requires passive pedestrian detection or pushbuttons in the refuge island.
- Installing pedestrian signal phasing when the crossings are currently unsignalized can range from \$65,000 to \$250,000. An LPI can range from \$500 for controller setting changes only to several thousand dollars if an engineering study or crosswalk markings are also required. A two-stage directional crossing can range from \$2,000 with no new pedestrian signal infrastructure to over \$40,000 with new pedestrian signal infrastructure.

RESOURCES

Treatment applications and general design guidance:

[VDOT IIM 384.0](#)

[VDOT Traffic Engineering Design Manual](#)

[Virginia Supplement to the MUTCD](#)

General guidance:

[FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations](#)

[FHWA STEP Resources](#)

[FHWA Pedestrian Facilities Users Guide](#)

[VDOT Pedestrian Safety Action Plan](#)

[NACTO](#)

[FHWA Tech Brief](#)

Guidelines are provided for informational purposes only. For detailed design guidance, please refer directly to design manuals and standards.

For more information on **Pedestrian Signal Control Treatments** and other bicycle and pedestrian treatments, visit virginiadot.org/programs/bikeped/bicycle_and_pedestrian_treatments.asp

